

1. A method of measuring the volume of a biological cavity having an inner
2 wall, comprising the steps of:
moving a multi-axis accelerometer within the cavity such that it interacts with the
4 inner wall at a plurality of points and outputs an acceleration signal indicative of such
interactions; and
6 double integrating the output of the accelerometer to determine the three-
dimensional volume of the cavity.
2. The method of claim 1, wherein the axes of the accelerometer are
2 orthogonal to one another.
3. The method of claim 1, wherein the accelerometer is a 3-axis
2 accelerometer.
4. The method of claim 1, wherein the accelerometer is a micro-electro-
2 mechanical system (MEMs).
5. The method of claim 1, wherein the accelerometer is supported relative to
2 the distal tip of a catheter.

6. The method of claim 5, wherein the accelerometer is mounted on a
2 moveable member facilitating:

a first position, wherein the member is retracted into the tip for insertion
4 into the cavity, and

a second position, wherein the member is extended from the tip for interaction
6 with the inner wall.

7. The method of claim 5, wherein:
2 the cavity is a human blood vessel; and
the accelerometer interacts with the inner wall as the catheter is withdrawn from
4 the vessel.

8. The method of claim 1, wherein the plurality of points approximates a
2 helix.

9. A method of measuring the volume of a blood vessel having an inner wall,
2 comprising the steps of:

placing a multi-axis accelerometer at the end of a catheter;

4 inserting the catheter into the blood vessel to be measured;

withdrawing the catheter in such a way that the accelerometer interacts with the
6 inner wall at multiple points and outputs an acceleration signal indicative of such
interactions; and

8 double integrating the output of the accelerometer to determine the three-
dimensional volume of the vessel.

10. The method of claim 9, wherein the axes of the accelerometer are
2 orthogonal to one another.

11. The method of claim 9, wherein the accelerometer is a 3-axis
2 accelerometer.

12. The method of claim 9, wherein the accelerometer is a micro-electro-
2 mechanical system (MEMs).

13. The method of claim 9, wherein the accelerometer is mounted on a
2 moveable member facilitating:

a first position, wherein the member is retracted into the catheter for
4 insertion into the cavity, and

a second position, wherein the member is extended from the catheter for
6 interaction with the vessel wall.

14. The method of claim 9, wherein the plurality of points approximates a
2 helix.

15. A system for measuring the volume of a biological cavity having an inner
2 wall, comprising:

a multi-axis accelerometer operative to output a signal indicative of acceleration
4 as a function of interactions with the inner wall; and

processing circuitry for performing the following functions:

- 6 a) receiving the signal output by the accelerometer, and
b) double integrating the signal to determine the three-dimensional volume of
8 the cavity.

16. The system of claim 15, wherein the axes of the accelerometer are
2 orthogonal to one another.

17. The system of claim 15, wherein the accelerometer is a 3-axis
2 accelerometer.

18. The system of claim 15 wherein the accelerometer is a micro-electro-
2 mechanical system (MEMs).

19. The system of claim 15, further including a catheter having a distal tip,
2 and wherein the accelerometer is supported relative to the distal tip.

20. The system of claim 19, further including a moveable member upon which
2 the accelerometer is mounted, the moveable member facilitating:

a first position, wherein the member is retracted into the tip for insertion into the
4 cavity, and

a second position, wherein the member is extended from the tip for interaction
6 with the inner wall.

21. The system of claim 20, wherein:
2 the cavity is a human blood vessel; and
the accelerometer interacts with the inner wall as the catheter is withdrawn from
4 the vessel.

22. The system of claim 15, wherein the plurality of points approximates a
2 helix.

23. The system of claim 15, further including apparatus for actively moving
2 the accelerometer to increase the number of interactions.

2 a first controller interfaced directly to the accelerometer to perform signal
conditioning and direct the accelerometer; and

4 a computer coupled to the first controller to perform the double integrations.

2 display for displaying a representatin of the biological cavity in accordance with the
result of the double integrations.